NOTES ON THE CASTING OF THE HANDLES OF SOME BRONZE VESSELS IN THE YIN DYNASTY

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While I was investigating the casting methods employed for *chüeh* and *chia*, a particularly interesting and somewhat complicated question came to my attention — the method employed in the casting of their handles. Although there were insufficient moulds relating to this part of the assembly, the seams around the handles were so clear as to make me ponder over it and try to make some deductions. I, then, examined several other kinds of utensils having the same D-type handles located vertically on the sides of the bodies as in the case of *chüeh*, and *chia*. The most useful examples in our Collection were the *kuei* and a mono-handled *ting*.

According to the seams relating to the handles, *chüeh* and *kuei* might be classified into the same group. For the sake of convenience, two *chüeh* (R1062 and R1054) and one *kuei* (R1078) are taken for illustration. On the belly of the *chüeh* R1062 (Pl. I, 1) there may be noted the principal decor belt, which consists of two dissolved animal masks each with two bulging eyes in high relief. This decoration belt ceases to appear under the handle where is left a rectangular space in which a character appears. This non-decorated space is a little lower in level than the surface of the body, and on both the left and right side seams due to mould joins may be distinguished. No seam is to be found either of the inner or outer surface of the smooth handle. The *chüeh* R1054 (Pl. I, 3) is a plainer one ornamented with only three bow-strings encircling the belly, but these too fade out beneath the handle. This handle exhibits a U-shaped cross-section and in the inner side of the handle, there remains some gray-coloured clay which is generally assumed to be part of the core section of the mould assembly for the handle. The clay is quite hard and to all appearances has been baked.

The *kuei* R1078 (Pl. I, 2) reveals much the same features as the two *chüeh*. It has two heavy handles on opposite sides of the body, each topped with a bovine-like head. The rectangular areas under each handle on the body

are featureless and lower than the belly surface; two vertical seams can be distinctly seen, just as those in the *chüeh*. The inner surface of the handles is filled with gray-coloured clay, which was the core of the handle mould-assembly.

The features of the handles of *chüeh* and *kuei* may be summarized as follows:

a. The encircling decoration bands cease under the handle leaving a blank space which in some cases contains characters.
b. This blank space is usually either higher or lower than the surface of the vessel body.
c. On the left and right borders of this blank area seams are usually found.
d. No mould join seams may be discerned on either the outer or the inner surface of the handle.

Let us consider now a second example, the *chia* R2039 (Pl. I, 4). Its mouth is flaring and the legs are slightly spread. The belly is decorated with two pattern belts. Each belt is made up of three dissolved animal units divided by the central lines of the three legs where the mould-joins are located. The handle is located just above one of the legs and is divided into two parts by a mould seam. The outer surface of the handle as well as that portion of the vessel body below the handle are at two different levels to the left and right of the join line as a result of a shifting of the adjoining moulds. The decor belts do not cease abruptly below the handle as in the case of the *chüeh*.

These features might be summarised as:

a. The decoration does not break up behind the handle.
b. Seams occur along the centre of the handle.
c. Below the handle this mould-join on the body continues and coincides with that of the centre of the handle.

A second *chia* R2046 with a partly broken handle provides a third set of data (Pl. II, 3). The pattern is the same as the *chia* above. Two distinct center seams may be seen on both the surfaces of the upper and lower segments of the broken handle just as on the handle of *chia* R2039. The main difference between the two *chia* is in the area below the handle on the body. The decoration of R2046 ceases abruptly leaving a blank space with three seams, one in the centre and two seams on the left and right side. These three seams are approximately equally spaced, the central one protrudes sharply like a ridge and seems to have partly the characteristics of the *chüeh* and partly of the *chia*. These features

may be summarised as:

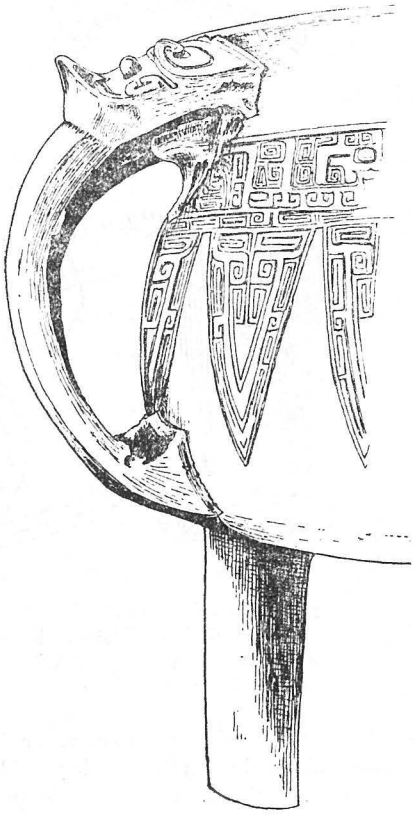
a. The encircling decor ceases beneath the handle on the body.

b. Mould seams occur on the central of the handle.

c. Beneath the handle on the blank space there are three equally spaced seams.

The fourth type of handle is that of the mono-handle *ting* R1110 (Pl. II, 1). The belly is similarly decorated with three dissolved animal masks of which consists the main decoration belt and 18 hanging blades below the belt. The handle surmounted by a ram-like animal-head is located on the centre line of one of the hanging blades. Vestige of seam could be found under scrutinous inspection, the belt of decoration was continuous.

A detailed reconstruction of this handle is illustrated in Fig. 1. There are two mounds of metal under each end of the handle. The mounds seem to function as a means of strengthening the connection of the handle and the body. The handle and the bowl of this *ting* were distinctly separately cast. Two distinct fissures appear around the line of junctures of the handle to the body.

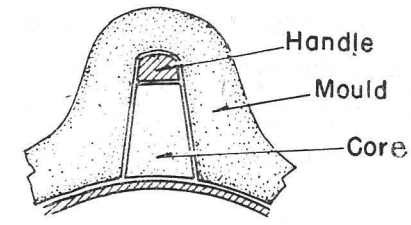


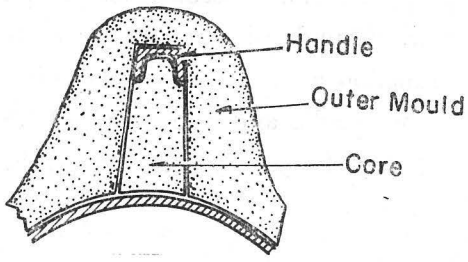
Fig, 1, An illustration of *ting* R1110 (Hsi-pei-kang tomb 1435) showing metal mounds under each end of handle and the fissures around the line of junctures.

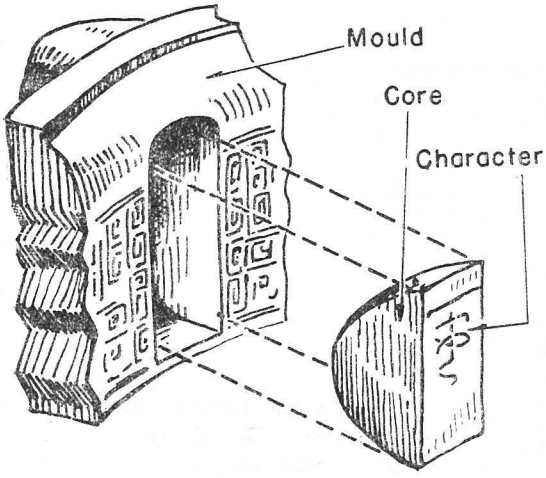
According to the four kinds of handle seams revealed by the four groups of vessels mentioned above, four kinds of moulds or assemblies of moulds meeting the said features are suggested as follows respectively.

1. An integral mould* with separate core for the handles of *chüeh* and *kuci*.

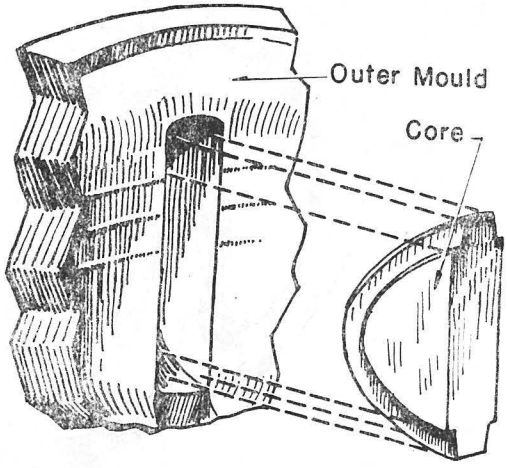
The seamless handle surface and the two seams on the left and right sides of the undecorated space behind the handle strongly suggest that the mould of *chüeh* and *kuci* around the handle were integral, but with a separate handle core. Besides, the characters usually appeared on the space behind the handle supports too this integral core assumption. Details of thes mould assemblies are illustrated in Fig. 2 and 3.







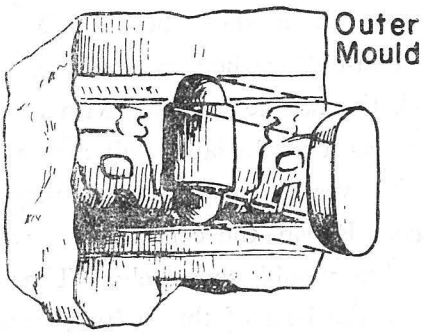
Fig, 2, Mould assembly for the handle of *chüeh* R1062 (Hsi-pei-kang tomb 1745) with an integral outer mould and solid core.



Fig, 3, Mould assembly for the handle of *chüeh* R1054 (Hsi-pei-kang tomb 1400) same as that of R1062, but the handle is U-shape cross-sectioned.

* The idea of an integral (one-piece) mould should, of course, take into account the fact that it would originally have comprised two segments centred along the handle and leg. This join is what Noel Barnard calls a 'preassembly join'. Sometimes the artisan succeeds in hiding it altogether.

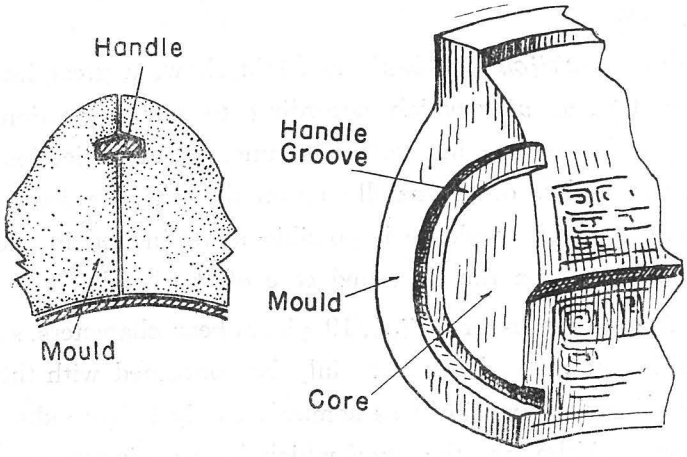
These assumptions may be more clearly illustrated by examining a piece of mould (P1. II, 2 and Fig. 4; A221, YH126) which shows an ear of a certain vessel. This integral mould with separate core casting ideas will also apply to the casting of many ornament pieces of chariot with ear.



Fig, 4, Mould assembly for the ear of a certain bronze vessel in Yin dynasty.

2. Bi-valve moulds for the handle of *chia* R2039.

Two symmetrical half moulds, which were divided vertically in a position located on the centre line of the handle, are considered to be used in this kind of *chia* handles. Although actual handle moulds for the *chia* have not yet been found, still, a very likely example of this kind of mould may be illustrated by the mould of a *mao* (P1. II, 4; A1440, YH083). Around the socket portion the *mao* was divided into two parts located vertically on the centre line of the loop. Just as with the mould for the loop of a *mao*, the core portion of the handle mould of the *chia* was also split half and half down the center line, and constituted an integral part of the bi-valve mould as shown in Fig. 5. This is why seams always appeared in the centre line of the handle as well as behind the handle on the body, which is the direction the mould join seams appear.



Fig, 5, Bi-valve mould assembly for the handle of *chia* R2039 (Hsiao-t'un tomb 232).

3. Bi-valve mould with a divided two-piece core for the handles of the *chia* R2046.

The seams of *chia* R2046 suggest that the assembly of the handle was of this method. But it is difficult to understand why this method was adopted. It is more complicated although it seems to be a stage between Method 1 and Method 2. Perhaps it may employ 'cast-on' method which was said already prevail in that period. In this method, the handle together with the portion of the body behind the handle was taken as a undividable unit and may be cast first and then put into the mould of the vessel body. Then it may reveal three seams as appeared on the handle of *chia* R2046, the central seam was the seam left when cast the handle with bi-valve mould separately. The handle and the body will then be fused together by the heat of the melting bronze poured into the mould of the body.

4. Separated casting of handle for the mono-handled *ting*

The distinct 'seams' or fissures around each end of the handle, the un-disrupted faultless pattern, the strengthening mounds and, sometimes the spill-over metal over the pattern strongly suggest that the body of this vessel and the handle were cast separately. Two of the separated methods may be used: first, the body with two mounds cast beforehand and then the mould of handle was put in the right position and cast. Second, the handle and the body were jointed together by running melting bronze which afterward formed the two mounds.

If the presumption that the more perfect types came later than the cruder ones, so that such a series of changes would have a direct chronological value. In the technique of handle-making, the courses followed in order to obtain a better production are vividly seen.

The casting of the handles of *chüeh* and *kuei* no doubt shows a great improvement over the casting of that of *chia* which according to our inspection, there was no exception in the handle casting methods among our collection. First, no spicules of fins on the surface of the handle or on the belly needed to be finished. Secondly, characters which would be impossible to be incised in the bi-valve method could easily be made on the separated core of the handle.

According to the inspection 43 pieces of *chüeh*, 19 pieces bear characters, so that the reason of the transition of method might mainly be concerned with the elimination of the fins. The character incision was somewhat only a by-product of the result of this transition. Although, the *kuei* which bear no inscriptions

are too small in number to deduce that *kuei* come earlier than *chüeh*, nevertheless we may say that the uninscribed ones may come earlier than the inscribed ones whether they are *kuei* or *chüeh*.

Chia R2046 is still a puzzle regarding to its status in the evolution of casting. Although we may explain it as an intermediate stage between the divided and integral with separate core of casting by its nature, still this method which R2046 employed really had all the disadvantages of both the first and second method, namely the seams of the handle and the impossibility of incision of characters. Completely different from the method of handle-making of the various vessels mentioned above, the making of *ting* handle adapted a new method other than the variation of the shape of mould, namely separate casting and then join two bronze parts.

According to the technical evolution mentioned, we may arrange the typological division of the handle casting as follows:

chia→*chia* R2046→*kuei* and *chüeh*→mono-handled *ting*.

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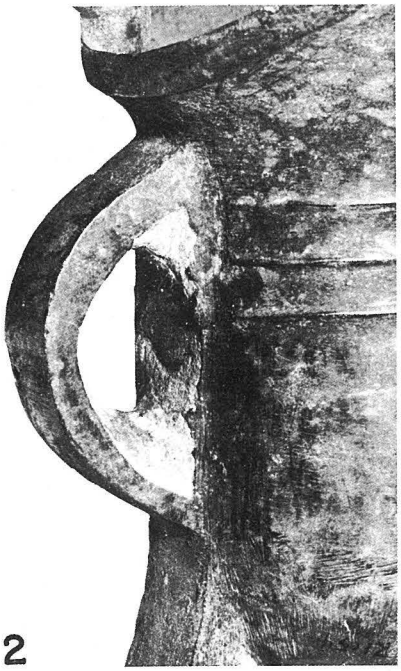

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圖版貳
Pl. II

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